# MINOS Near Detector Front End Electronics Master Clock Fanout (MCF) Printed Circuit Board review

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# I. MCF

## A. General Description

- Picture of module provided (mcf.jpg)
- Schematics Provided in PDF File (mcf_schematics.pdf)
- Connector Types
  - (2) 96-pin DIN male backplane connectors, 3M 7296-50C2-TH
  - (12) Keyed RJ45 jacks, AMP 558310-1
  - (1) 10 pin header, 3M 2510-6003UB
- Connector pinouts available within schematics.

# I. MCF (Cont.)

## B. Mechanical Description

- No Special Subrack Requirements
- Board Size: 280mm x 9U standard VME
- Board Thickness: 0.062" Standard, No Edge Milling
- Stiffeners: 3 horizontal, 1 vertical
- Warpage: Standard Acceptable
- Chamfers: Not Required, Not Specified
- Clearances: DRC 8 mill traces, 8 mil spacing
- Non-circuitry areas bare
- ESD Protection: None (Not Available in Crate)
- Front Panel:
  - Painted, anodized aluminum with silkscreen
  - Ejector Handles with holdings screws
  - LEDs present with labeling
  - Connectors not isolated from front panel
- Keying: (12) HOTLink driver output connectors keyed to prevent accidental insertion of HOTLink cable into other RJ45 jacks.
- Test & Repair:
  - Standard Test stand, with Open Side Panel
  - Test points on PCB for GND and signal monitoring
  - Full Checkout & Support from FNAL/ANL

# I. MCF (Cont.)

## C. Electrical Description

- Power Pins and protection:
  - (3) VCC pins, (8) GND pins on J1
  - 4A picofuse, 3A average current draw from VCC.
  - 1N5908 transorb
- I/O Connector Types
  - 12 Front panel RJ45 I/O connectors: Master Clock Interface, used for sending HOTLink serial transmissions; also contains bi-directional serial LVDS slow control interface.
  - 10 pin header with keyed shroud for JTAG download of Altera PLDs and FPGAs.
  - J1 Backplane: 96-pin DIN, TTL, Power, & Ground
  - J2 Backplane: 96-pin DIN; custom differential LVDS cable bus to distribute clock and timing signals
- Power Distribution: Use Power Planes, Meets IPC Industry Standards
- Air Flow: Crates have integral bank of six fans.